The A-STEP project fosters collaboration between university faculty and pathway partners (Figure 2) to implement common set of tools (NextGen ASET Toolkit) across a science teacher training and development pathway (Figure 1 & Table 1). Partnerships across these steps function under shared goals and paradigm shifts for pedagogical reform along the pathway. Data is collected at various points across the pathway (Fig. 3). A-STEP promotes change across our NIC and the local pathway partners, moving beyond awareness and into impacting the enactment of the NGSS in respective K-12 classrooms.

Project Overview

The Alliance for Science Educators NIC (ASET) is an interdisciplinary collaborative of researchers and practitioners highly focused on identification and continuous improvement of key supports and practices that increase capacity to reform science teacher preparation. Further, this alliance crosses traditional academic barriers by coupling research and practice and prioritizing practical knowledge (that is generalizable across diverse settings) over theoretical knowledge that might improve practice (Bryk, et al., 2015). The A-STEP NIC represent eight universities across the country serving as a robust mechanism for accelerated learning, improvement, and dissemination at scale (Bryk, et al., 2015). By leveraging interdisciplinary expertise of NIC partners, prioritizing practice over theory, and making knowledge (i.e., findings from PDGA cycles) a “live resource” (Dolle et al., 2013, p. 444). Data produced in PDGA cycles across the NIC enables NIC partners to collectively 1) examine the effectiveness of prior preparation and professional development programs and 2) continue to improve the tools and the processes for using them. Generalizability increases by understanding this variation and by using variation as an important data source for subsequent PDGA improvement cycles.

Research design, data collection & analysis methods

This project focuses on the pathway that science teachers follow in their development, more specifically in their movement from awareness of the NGSS to enactment of the NGSS. We are interested in the mechanisms that promote, support or prevent this movement. Figure 2 outlines the tools, methods and participants along this pathway (see attached diagrams for SPS survey and Toolkit links on the website). Figure 3 illustrates where the data collection points align with the goals of the project. The attached documents to this poster provide a deeper look at the theoretical underpinnings of this work (Roh bene and driver diagrams). The project is evaluated monthly within NIC meetings (see ASTEP info sheet attached) as well as weekly via an External Evaluation Panel (see box insert below).

Findings and implications

Since the inception of the ASTEP project in June 2019, NIC members have met monthly (virtually) to plan, do, study and act (PD&A cycles) on grant goals. NIC members working on the same pathway step (fieldwork supervisors, induction (early teaching years), professional development with school districts) share strategies at monthly meetings. This provides real-time feedback to data collection and results. New teacher mentor training and adaptations were delivered on Zoom, summer PD was delivered with online adaptations, and video of the Toolkit was added to adapt for virtual presentations and workshops. Although COVID decreased some activity and expected participation at some NIC sites, it did increase their participation by adapting outreach and formats only Table 1 summaries the number of participants per pathway. Since this project builds on a previous NSF project, implementation of the Toolkit in methods courses was established. Paths 2, 3 and 4 required more planning and eventual implementation in Y2. Further analysis of the overlap of partner interviews, NIC member interviews, pathway and usage across steps and monthly meeting reveals that successes and problems are similar in each step, although there are materials and resources for science instruction, the time allotted for covering science or providing appropriate PD especially at the elementary level is minimal. At levels (K-12), data indicates that the goals of members at each step are the same: enact science and NGSS as it is meant to be implemented – yet barriers continue to persist. The emphasis emerging is to train mentor teachers and university supervisors to more correctly identify the steps in supporting the enactment in the teacher preparation pathway. We continue to study how the ASET Toolkit provides common dialogue for this process. We also continue to refine our data collection methods (increasing tool use experience, examining the relevance of SPS surveys questions and integrating survey tools from newer research related to coherence where preservice teachers are surveyed to capture their perspectives on how knowledge and practices from their teacher preparation program transfer to their teaching experiences in the field (Hall, I., Campbell, T., & Kunder, S. (2012); Servantez, F., Kluft, K., & Hammerness, K. (2019). Given our focus on improvement science, we are able to plot our data collection to capture the essence of progress at each step, each serving the work and demonstrating yet with the same goals related to teacher preparation and the enactment of teacher for more on our research https://www.nextgenaset.org/research/